**IT Applications, Unit 4**

**Ch 6, Developing a solution using spreadsheet software, p 192-213**

Case Study: Point Pleasant Social Service Program – organisational outline and current practice

**Designing spreadsheet solutions and output**

1. Describe what is involved in the solution design stage.

At the solution design stage a draft of the solutions is created usually on paper. This allows for changes to be made without impacting on the development of a solution. The solution design stage is when it is decided how the solution will function and the how it will appear to users, and the evaluation criteria.

**Spreadsheet Design Tools**

Elaborate under each of the following design tools:

1. IPO chart

An IPO chart is used during the design process and clearly identifies the solutions input, output and the processing steps required to transform the data into information. This gives the developer a chance to see how much formula development work may be necessary during the manipulation stage of the project.

1. Flow chart, (list what each of the symbols mean from fig. 5-10.

Start

* Rounded rectangle (at the beginning) means the start
* Rectangle means the processes

Process

* Parallelogram represents the inputs and outputs

Input/Output

* Strange shape represents when the solution is saved

Save

* Diamond is where the decision is made (yes continue on, no stop

No

Decision

And go back)

* Rounded rectangle (at finish) means the end

End

Yes

1. Formula list

A formula list is similar to a data dictionary; it shoes detailed lists of the formulas to be used to achieve each bit of the output that has been identified in the IPO chart.

1. Structure chart

A structure chart is a graphic representation of how a spreadsheet solution might work. These charts can be created in a mind-mapping application like Inspiration, Visio, as a Microsoft Word organisation chart object or by hand.

1. Layout diagrams

A layout diagram shows the basic layout of each worksheet in the spreadsheet solution. The layout diagram should clearly indicate the type of data to be entered into the cells of a spreadsheet, indication of the contents of each cell, labels that aid in the entry of data into the correct cell, any validation rules to be used and the error messages to be used, the formats and convention to be used when manipulating data and headings, subheadings and instructions.

**Formats and conventions, p 202-**

1. list under each of the following subheadings the major formats and conventions that apply to spreadsheets:
   1. numerical information

The formats and conventions for numerical information are:

* numbers are naturally right-aligned in columns (important for validation)
* money values have two decimal places or none
* decimal points are aligned by using a consistent number of decimal places
* percentages in columns will have the % symbol at the top of the column rather than with the data
* subtotals have a single line above the total
* grand totals have a single or double line below the total
* grand totals are in bold
* symbols indicating a unit of measure usually appear in the column heading rather than next to each value
* use named ranges of cells to make formulas easier to understand
  1. financial reports

The conventions and formats for financial reports are:

* use a space or comma to separate numbers greater than 999; for example 1,999
* use italics to indicate addition or subtraction
* subtotals have a single line above the totals
* include a $ sign in the column heading s-rather than next to each money value
* dates are right aligned to allow for double figures
  1. charts and graphs

The validation rules for charts and graphs:

* graphs and charts must have titles identifying the name of the organisation and the purpose of the graph or chart
* the x-axis and the y-axis must be labelled
* use a key of more than one set of data is provided on the same graph or chart
* include author identification and/or source of data, date and a filename (if appropriate)
* include the unit of measurement on the relevant axis
* label each segment of a pie chart
* arrange each segment of a pie chart from largest starting from 12 o’clock
* include absolute figures as well as percentages
* choose colours that match the information being discussed
* use bar charts to compare parts of a whole or relationships between segments
* use graphs to show trends or relationships between values on each axis
* if more than one line is used in a line graph very the thickness or line type of each one
* limit the number of lines represented to five or six
* treat a spreadsheet printout as a report, hence conventions apply
* suitability centre a sheet on a page
* explain the purpose of the spreadsheet and identify the author
* where cells require user input clearly label what has to be entered
* for group input cells, frame them or use a suitable colour to distinguish them
* where cells display results clearly indicate the cell and the unit of measurement
* from group output cells frame them or use a suitable colour (different from the group input cells) to distinguish them
* group or frame cells that will be printed, with cells nit for printout located outside
* list all equations in a separate document
* include an a appropriate footer identifying the filename, date and page number

1. Describe the file naming conventions for spreadsheets.

The file name for a spreadsheet should indicate it purpose and any time period it covers, also each worksheet should be given a short but meaningful name.

**Designing a macro**

1. What is a macro?

A macro is an automated series of tasks. A macro is used to automate a series of tasks that are performed frequently. Macros are planned using pseudocode (also known as structured English).

**Validation**

1. Describe each of the following types of validation used in a spreadsheet:
   1. Range checking

Range checking involves checking to ensure that data falls within a certain ‘range’. For instance, the year level in most secondary schools is in the range of 7 to 12.

* 1. Existence checking

Existence checking checks for the existence of things like products codes in other worksheet tables using a LOOKUP( ).

* 1. Conditional formatting

Conditional formatting is formatting the cells such that they can alert the user to possible errors.

* 1. Data type checking

Data type checking checks to see that data is a certain type, this can be useful if the data needs to be of a particular type.

* 1. Restricted data entry

Restricted data entry, restricts what data can be entered into a document, because of this it is the best way to ensure that the data being entered is valid. For example restricted data entry can be done through the use of a drop down list.

* 1. Validation alerts

Validations alerts are used in electronic data entry process. Validation alerts are dialogue boxes that appear if the being tested does not adhere to the validation rules.

**Planning to test a spreadsheet solution**

1. What is the difference between validation and testing?

The difference between validation and testing is validation is involved in when the input of the solution is being done whereas testing is concerned with the output of the solution instead.

1. When is the test plan or test table created?

The planning is carried out during the design stage of the solution but the test table itself is created after the development stage (i.e. after the actual solution has been created).

1. Attributes or properties to a spreadsheet solution that need to be tested; elaborate under each of the following testing types:
   1. Functionality testing

The functionality of a system relates to the activities or actions that it was designed to carry out. To test the functionality of a system it is important to look at the original problem and determine o the solution meets the organisation’s needs. When testing the functionality it is important to continually test formulas to ensure they do what they are meant to, it is also important to test a solution for every possible outcome (i.e. testing the upper and lower boundaries of a range of codes using a LOOKUP formula).

* 1. Presentation testing

During the design stage of the solution it is important to make a decision on the appropriate format of the solution, for example how the solution should be communicated- as a report, chart or a list of results. When decisions are made about the format the audience must be taken into consideration (a spreadsheet with many calculations would not be given to the CEO). Some ways to evaluate the successfulness of a presentation are:

* Is there an appropriate amount of white space?
* Have easy to read and appropriate fonts been used? Are they used consistently?
* Is there a balance in terms of the graphics on each page?
* Is the intended audience easily identifiable?
* Was the background colour chosen carefully? Is it either white or grey?
* Is the colour scheme consistent? Including the colours used for links?
* Are the labels on charts easy and large enough to read?
  1. Usability testing

All spreadsheets whether they are simple worksheets or complicated solutions with macros need to be user friendly. The information being communicated should be easily accessible to users. To test if the solution will be easily usable for users the following questions can be asked:

* Do you need to scroll to read information on the index page of the worksheet?
* Do you need to scroll more than two screen lengths to read information on worksheet?
* Are all worksheets clearly labelled?
* Is it easy to get back to the index or introduction page?
* Are consistent navigation buttons always used? Are they always visible and placed in a consistent location?
* Are there any words that are underlined but not hyperlinked?
* Do all the hyperlinks work?
* Can the user accidently delete formulas or change validation rules?
* Are input cells unprotected and the rest of the spreadsheet protected?
  1. Accessibility testing

A spreadsheet solution needs to be accessible, to test that a spreadsheet is accessible consider the following:

* Does the solution open on the right worksheet?
* Are the font sizes easy to read?
* Is there a limited use of red and green colours for people who are colour blind?
  1. Communication of message

The important information presented within a spreadsheet whatever format should be clear and obvious. It must convey the important pieces of information without users getting lost in the other less vital information. A good way to ensure that the spreadsheet solution does this is to keep it simple.

**Evaluating the solution and output**

1. What does evaluation consider?

Evaluation considers the efficiency and effectiveness of a solution. It usually takes place after the solution has been implemented for a period of time.

1. What information needs to be gathered?

To evaluate the output the information about how the solution functions and whether it meets the systems goals needs to be gathered from a variety of users.

1. Who is best to undertake the evaluation?

To make sure that the solution is evaluated impartially it is best done by someone other than the developer of the solution.

1. When is the evaluation criteria developed?

The evaluation criteria are developed in the design stage of the problem solving methodology so that the system designers can know what to include in the solution.

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